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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DOUGLAS W. AKERS

Appeal 2008-6187
Application 10/788,743
Technology Center 3600

Decided:[1] April 15, 2009

Before: WILLIAM F. PATE, III, JENNIFER D. BAHR, and STEFAN STAICOVICI, *Administrative Patent Judges*.

BAHR, *Administrative Patent Judge*.

DECISION ON APPEAL

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[1] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

STATEMENT OF THE CASE

Douglas W. Akers (Appellant) appeals under 35 U.S.C. § 134 from the Examiner's decision rejecting claims 1-10, 12-19, and 21-23, which are all of the claims pending in the application. We have jurisdiction over this appeal under 35 U.S.C. § 6 (2002).

The Invention

Appellant's claimed invention is directed to a method for performing non-destructive testing of materials using positron annihilation. Specification, para. [0003].

Claims 1 and 12, reproduced below, are illustrative of the claimed subject matter.

> 1. A method for evaluating a material specimen, comprising:
>
> mounting a neutron source adjacent the material specimen;
>
> mounting a detector adjacent the material specimen;
>
> bombarding the material specimen with neutrons from the neutron source to create prompt gamma rays within the material specimen, some of the prompt gamma rays being emitted from the material specimen, some of the prompt gamma rays resulting in the formation of positrons within the material specimen by pair production;
>
> collecting positron annihilation data by detecting with the detector a plurality of emitted annihilation gamma rays resulting from the annihilation of positrons, the detector producing the positron annihilation data;

processing collected positron annihilation data in accordance with a Doppler-broadening algorithm; and

continuing to collect and process positron annihilation data to measure an accumulation of lattice damage over time.

12. A method for evaluating a material specimen, comprising:

mounting a neutron source adjacent the material specimen;

mounting a detector adjacent the material specimen;

bombarding the material specimen with neutrons from the neutron source to create prompt gamma rays within the material specimen, some of the prompt gamma rays being emitted from the material specimen, some of the prompt gamma rays resulting in the formation of positrons within the material specimen by pair production;

collecting positron annihilation data by detecting with the detector a plurality of emitted annihilation gamma rays resulting from the annihilation of positrons, the detector producing the positron annihilation data;

storing the positron annihilation data on a data storage system for later retrieval and processing; and

continuing to collect and store positron annihilation data, the continued collected and stored positron annihilation data being indicative of an accumulation of lattice damage over time.

The Rejections

Appellant seeks review of the Examiner's rejections of claims 1-10, 12-19, and 21-23 under 35 U.S.C. § 112, first paragraph, as containing subject matter that is not described in the Specification in such a way as to enable one skilled in the art to use the invention, and under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellant regards as the invention.

Appellant does not contest the Examiner's provisional rejection of claim 2 under the judicially created doctrine of obviousness type double patenting over claim 3 of copending Application 10/383,096. Therefore, we summarily sustain this rejection.

SUMMARY OF DECISION

We AFFIRM-IN-PART.

ISSUES

In rejecting the claims under 35 U.S.C. § 112, first paragraph, the Examiner asserts that Appellant's Specification provides neither an adequate description nor enabling disclosure as to: a) how one selects the Doppler-broadening algorithm or positron lifetime algorithm to use; and b) what, if any, modifications have to be done to adapt the selected algorithms to Appellant's situation, for example, how the constants that are inherently part of any algorithm are evaluated. Answer 4. According to the Examiner, Appellant's Specification "basically sets forth the algorithms and data processor as 'black boxes' without sufficient details of internals thereof, to enable an artisan to make and use an operative embodiment of the invention,

without undue experimentation." Answer 5. For example, the Examiner alleges that Appellant's Specification "indicates that there are different known Doppler broadening algorithms but fails to disclose which of these known algorithms would be suitable for use in the present invention", thereby leaving the artisan to resort to a "trial-and-error process" to select one of the known algorithms. *Id.* The Examiner further asserts that Appellant's Specification fails to set forth the conditions, or criteria, used to determine from the processed data whether defects are present, so as to prevent false identification of defects (a high false-positive rate). Answer 7-8. Additionally, the Examiner contends that Appellant's Specification does not disclose how the Doppler-broadening and positron lifetime algorithms are combined in order to produce an output data indicative of the presence or absence of a lattice defect. Answer 9-10. The Examiner asserts that Appellant's Specification lacks enabling disclosure of which of the known algorithms can be used with a single detector. Answer 10. The Examiner additionally points to Appellant's failure to disclose details of feedback between the data processing system and each of the algorithms, as illustrated in Fig. 2. *Id.* Finally, the Examiner alleges that claim 12 lacks an essential step of processing in order to effect a "method of *evaluating* a material specimen" (emphasis ours) as called for in the preamble of the claim. Answer 12-13.

In response, Appellant asserts that the Examiner has not addressed the factors set forth in *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988), discussed further *infra*, to support the assertion that the disclosure in Appellant's application is insufficient to enable a person of ordinary skill in the art to practice the claimed invention without undue experimentation.

Appeal Br. 22. In essence, Appellant contends that given that Doppler-broadening algorithms and positron lifetime algorithms are well known in the art, as indicated in Appellant's Specification and undisputed by the Examiner, the Specification need not describe them further. Appeal Br. 23. According to Appellant, a person of ordinary skill in the art would well know how to pick a suitable algorithm and select appropriate constants, making any experimentation routine, and not undue. *Id.* Appellant further asserts that much of the Examiner's rationale for the rejection for lack of enablement is based on limitations not in the claims. Appeal Br. 16-21.

The Examiner's stated rationale for the indefiniteness rejection stems essentially from the concerns of the Examiner set forth in the enablement rejection. Answer 14-15.

OPINION

The enablement provision of 35 U.S.C. § 112, first paragraph, requires the specification of a patent application to describe the invention, and the manner and process of making and using it, "in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same." "The enablement requirement ensures that the public knowledge is enriched by the patent specification to a degree at least commensurate with the scope of the claims." *Nat'l Recovery Techs., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1195-96 (Fed. Cir. 1999). Accordingly, the specification must provide sufficient teaching such that one skilled in the art could make and use the full scope of the invention without undue experimentation. *CFMT, Inc. v. Yieldup Int'l Corp.*, 349 F.3d 1333, 1338

(Fed. Cir. 2003); *Genentech, Inc. v. Novo Nordisk A/S,* 108 F.3d 1361, 1365 (Fed. Cir. 1997); *Wands,* 858 F.2d at 736-37. "The key word is 'undue,' not 'experimentation.'" *Wands,* 858 F.2d at 737 (quoting *In re Angstadt,* 537 F.2d 498, 504 (CCPA 1976)). That is, the specification need only teach those aspects of the invention that one skilled in the art could not figure out without undue experimentation. *See, e.g., Nat'l Recovery Techs.,* 166 F.3d at 1196 ("The scope of enablement . . . is that which is disclosed in the specification plus the scope of what would be known to one of ordinary skill in the art without undue experimentation."); *Wands,* 858 F.2d at 736-37 ("Enablement is not precluded by the necessity for some experimentation such as routine screening"). In calling into question the enablement of an applicant's disclosure, the examiner has the initial burden of advancing acceptable reasoning inconsistent with enablement so as to shift the burden to the applicant to show that one of ordinary skill in the art could have practiced the claimed invention without undue experimentation. *In re Strahilevitz,* 668 F.2d 1229, 1232 (CCPA 1982).

Factors to be considered in determining whether a disclosure would require undue experimentation include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. *Wands,* 858 F.2d at 737.

While the Examiner has pointed to specific details, such as the values for the constants used in the algorithms described in Appellant's Specification, which are not disclosed in Appellant's Specification, the

Examiner has not adequately explained or shown that such details could not have been determined by a person of ordinary skill in the art without undue experimentation. Appellant correctly points out that the Examiner has not addressed *any* of the *Wands* factors to show that the omission of such details from Appellant's application renders Appellant's disclosure insufficient to enable a person of ordinary skill in the art to practice the invention without undue experimentation.

Appellant's Specification admits that "systems for detecting positron lifetimes, as well as the algorithms utilized thereby," were well-known in the art at the time the present application was filed and "could be easily provided by persons having ordinary skill in the art after having become familiar with the details of the present invention." Specification 17, para. [0046]. The Examiner does not dispute that systems and algorithms for detecting positron lifetimes were well-known in the art at the time the present application was filed. Appellant's Specification also admits that "[s]everal different types of Doppler-broadening techniques have been developed and are being used *in the positron annihilation art* and could be easily implemented in the present invention by persons having ordinary skill in the art after having become familiar with the teachings of the present invention." Specification 18, para. [0048] (emphasis ours). Moreover, Appellant's Specification even gives a particular example, by reference to an issued US patent incorporated by reference in its entirety, of a Doppler-broadening algorithm suitable for use in the present invention. *Id.*

The Examiner has not disputed that Doppler-broadening techniques were known and used in the positron annihilation art at the time of the present invention. The Examiner likewise has not offered any evidence or

explanation as to why the particular Doppler-broadening algorithm referred to in Appellant's Specification would have been unsuitable for the present invention or why the disclosure incorporated from the referenced US patent would have been inadequate to enable one of ordinary skill in the art to practice Appellant's claimed invention. The Examiner has not made any findings whatsoever as to the relative level of skill in the art, or explained why the selection of either the particular positron lifetime algorithm or the Doppler-broadening algorithm from among the known algorithms, or the constants and other adaptations thereto, for application to Appellant's invention, would have required more than routine skill and experimentation. Indeed, the Examiner has not made any findings as to how much experimentation, if any, would actually be required by a person of ordinary skill in the art.

As for the Examiner's criticism that Appellant's Specification fails to set forth the conditions or criteria to be used to determine from the processed data whether defects are present, we note that Appellant's claims are directed to a method for evaluating a material specimen, not to a method for classifying a material specimen as acceptable or not acceptable. Therefore, it is not necessary that the Specification disclose specific criteria or thresholds to effect such classification. Moreover, it is a well understood principle of quality control that setting very conservative criteria or sensitivity standards may lead to false indications of defects (false positives), while setting more lax criteria or thresholds may lead to defective specimens not being screened out. Quality control standards are determined largely by industry or regulatory standards in the industry in which the specimen is used.

The Examiner's insistence that the Specification disclose how the Doppler-broadening and positron lifetime algorithms are combined appears to us to be grounded on an unsupported assumption that the algorithms, or the results therefrom, are mathematically combined. The Examiner has not specifically pointed to any explicit disclosure in Appellant's Specification that the algorithms are mathematically combined. Nor do the claims explicitly require mathematical combination of the outputs of the algorithms. As indicated in paragraph [0007] of Appellant's Specification, the output from the Doppler-broadening algorithm is indicative of positron momentum, which tends to be relatively high in a defect-free or tight lattice structure and relatively low in structures with microcracks or large lattice structures. According to paragraph [0008] of Appellant's Specification, the positron lifetime data provides "[a]dditional information about the electron density of the material at the site of the annihilation." Thus, it is not clear that the Doppler-broadening and positron lifetime algorithms are in fact mathematically combined. Rather, it appears that they provide the reviewer of the data, whether human or automated, with different types of information upon which a determination to accept or reject the specimen may be based.

In a related criticism, the Examiner points to an omission of disclosure in Appellant's Specification of details of feedback between the data processing system and each of the algorithms, as illustrated in Fig. 2. Once again, there is no clear support in Appellant's Specification for any direct interaction between the Doppler-broadening algorithm and the positron lifetime algorithm. There is no indication in Appellant's Specification that the illustration of the double-headed arrow between the data processing system 24 and each of the algorithms implies anything more than the input

of unprocessed data from the data storage means in the data processing system 24 to each of the algorithms and the output of processed data from each of the algorithms to the data storage means in the data processing system. In any event, the Examiner has not provided any evidence or reasoning to show that Appellant's claimed invention requires feedback between the data processing system and each of the algorithms which would not have been appreciated and understood by those of ordinary skill in the art at the time the present application was filed.

The Examiner has not provided evidence or reasoning to support the assertion that Appellant's Specification lacks enabling disclosure of which of the known algorithms can be used with a single detector, as opposed to two detectors. Appellant's Fig. 7 depicts a detector assembly 116 that includes a single detector 130 that detects both prompt gamma rays and annihilation gamma rays, and produces prompt gamma ray data 120 and positron annihilation data 122. Specification 21, para. [0053]. This is an alternative to the embodiment depicted in Fig. 3, wherein two detectors 30 and 32 are used to provide input to the positron lifetime algorithm. Specification 16, para. [0044].

Finally, the Examiner's assertion that claim 12 lacks an essential step of processing in order to effect a method of *evaluating* a material specimen appears to be grounded on a narrower construction of the term "evaluating" than indicated in Appellant's Specification. In interpreting claim language, we apply the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description. *See In re Morris*, 127 F.3d

1048, 1054 (Fed. Cir. 1997). *See also In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). Appellant's Specification clearly contemplates an embodiment of the present invention wherein the data processing system 224 serves merely as a data collection device, collecting the prompt gamma ray data 220 and/or the positron annihilation data 222 produced by the detector assembly 216, and storing the data in a data storage system for later retrieval and processing. Specification 28, para. [0071]. Additionally, in summarizing the invention, Appellant's Specification states that "[a] method for evaluating a material specimen comprises: ... collecting positron annihilation data by detecting with the detector at least one emitted annihilation gamma ray resulting from the annihilation of a positron; storing the positron annihilation data on a data storage system for later retrieval and processing ...." Specification 6, para. [0013]. This clearly evidences that Appellant's Specification uses the term "evaluating" in the sense of collecting data about the specimen by detecting annihilation gamma ray emission and storing that data for later retrieval and processing. This is entirely consistent with the ordinary and customary meaning of the term "evaluate," namely, "1. To ascertain or fix the value or worth of. 2. To examine and judge carefully; appraise." THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE (4th ed. 2000), http://www.bartelby.com (last visited Apr. 4, 2009).

The Examiner's rejection of claims 1-10, 12-19, and 21-23 under the second paragraph of 35 U.S.C. § 112 is that the claims are vague, indefinite, and incomplete on the basis that their metes and bounds cannot be determined because of the purported deficiencies of Appellant's

Specification, discussed above. Answer 14-15. This rationale is not persuasive for the reasons discussed above.

CONCLUSIONS OF LAW

The Examiner has failed to discharge the initial burden of advancing acceptable reasoning inconsistent with enablement so as to shift the burden to the Appellant to show that one of ordinary skill in the art could have practiced the claimed invention without undue experimentation. Accordingly, the rejection of claims 1-10, 12-19, and 21-23 under 35 U.S.C. § 112, first paragraph, cannot be sustained. The Examiner's rejection of claims 1-10, 12-19, and 21-23 under 35 U.S.C. § 112, second paragraph, as being indefinite, likewise cannot be sustained.

The provisional rejection of claim 2 under the judicially created doctrine of obviousness-type double patenting is sustained.

DECISION

The Examiner's decision is affirmed as to claim 2 and reversed as to claims 1, 3-10, 12-19, and 21-23.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv) (2007).

AFFIRMED-IN-PART

Appeal 2008-6187
Application 10/788,743

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